AMENDMENTS TO THE DRAWINGS

Applicant is submitting herewith six (6) sheets of replacement drawing figures, which include FIGS. 18-24. The legend "related art" has been added to FIGS. 18-24. FIG. 24 has been amended to cure a typographical error.

The submitted replacement drawing figures are intended to replace FIGS. 18-24 submitted on January 22, 2002.

Attachment: Six (6) Replacement Sheets

REMARKS

Claims 13-24 are all the claims pending in the application. Claims 14-16 and 21-24 are withdrawn from consideration as being drawn to a non-elected invention. By this Amendment, Applicant amends claims 17-20 to cure minor informalities and adds claims 25-30, which are clearly supported throughout the specification.

I. Preliminary Matters

The Examiner has returned all of the initialed forms PTO/SB/08 submitted with the Information Disclosure Statements filed on January 23, 2002, August 21, 2003, January 21, 2005, and July 15, 2005.

II. Summary of the Office Action

Claims 13-24 are all the claims pending in the application. The Examiner has objected to the drawings, the specification, and claims 17-20. Claims 13 and 18-20 presently stand rejected. Claim 17 contains allowable subject matter.

III. Objections to the Drawings

The Examiner has objected to the drawings because of minor informalities. Applicant respectfully requests the Examiner to withdraw these objections to the drawings in view of the self-explanatory amendments to the figures and the specification. A copy of the marked up drawing figures is enclosed.

With respect to the objection of Figure 1 as showing cables (7,8) attached to the Port 1, whereas allegedly pages 30-31 of the specification disclose cables attached to the Port 2 (*see* page 5 of the Office Action). Applicant respectfully disagrees. Figure 1 relates to the first exemplary embodiment and the description on pages 30-31 of the specification relates to the third exemplary embodiment of the specification. In one embodiment, one port can be used and

in another embodiment, another port may be used. Accordingly, Applicant respectfully requests the Examiner to withdraw this objection to Figure 1.

IV. Objections to the Specification

The Examiner has objected to the specification because of minor informalities. Applicant respectfully requests the Examiner to withdraw these objections to the specification in view of self-explanatory amendments being made herein and in view of the following remarks.

With respect to the Examiner's objection of the second paragraph on page 27 of the specification (*see* page 7 of the Office Action), Applicant respectfully traverses. "25b a GOFF detector is connected to System 2." The 25b a GOFF detector is constituted in System 1 but is connected to System 2. In view of these remarks, Applicant respectfully requests the Examiner withdraw this objection of the second paragraph on page 27 of the specification.

The Examiner further alleges that it is unclear what "connection NG" stands for. Applicant respectfully submits that as is known in the art, "connection NG" stands for "connection is no good". In other words, it is a state in which a connection is not established due to some errors and there is no response.

With respect to the objection to pages 30-31 of the specification as being inconsistent with Figure 1 because Figure 1 shows cables (7,8) attached to the Port 1, (*see* page 5 of the Office Action). Applicant respectfully disagrees. Figure 1 relates to the first exemplary embodiment and the description on pages 30-31 of the specification relates to the third exemplary embodiment of the specification. In one embodiment, one port can be used and in another embodiment, another port may be used. Accordingly, Applicant respectfully requests the Examiner to withdraw this objection to the specification.

V. Objections to the Claims

Claims 17-20 are objected to because of minor informalities. Applicant respectfully requests the Examiner to withdraw these objections in view of the self-explanatory claim amendments being made herewith.

VI. Claim Rejections under 35 U.S.C. § 101

Claims 13 and 18-20 are rejected under 35 U.S.C. § 101 because the claimed invention is allegedly directed to non-statutory subject matter.

The Examiner has rejected Claims 13 and 18-20 on the basis that the Applicant's current claim language is directed toward "calculating transmission time [, these] final results fail to produce any tangible real-world result" (*see* page 11 of the Office Action). The Examiner further alleges that programmed functionality is an abstract idea rather than a practical application (*see* page 12 of the Office Action). Applicant respectfully submits that this rejection is improper.

In order for claimed subject matter to be statutory, "it is necessary for the claimed invention ***taken as a whole*** to produce a practical application." (MPEP 2106(IV)(B)(2)(a)). Applicant respectfully submits that the Examiner has misinterpreted the claims. The Examiner appears to be asserting that the end result of the claimed invention is calculating time, which is not a tangible, useful result. However, a useful and tangible result is ***conveying the emergency stop information more quickly and more frequently*** so as to stop the numeric control system in emergencies quicker than previously possible (page 26, first full paragraph to page 27 of the original specification). In other words, when the cycle is split into a number of sub-cycles, the data may be processed quickly and emergency stopping occurs faster (paragraph abridging pages 14 and 15 of the specification). Thus, the method of claim 13 has a useful, concrete, and tangible result.

Further, contrary to the Examiner's assertions, splitting a cycle into a number of sub-cycles is a useful, concrete, and tangible result which allows fast processing of data and quick stopping of the numeric control system in case of emergencies. Claims 18-20 depend on claim 13 and accordingly produce a useful, concrete, and tangible result at least by virtue of their dependency.

In view of the foregoing, Applicant respectfully submits that the 35 U.S.C. § 101 rejection of claims 13 and 18-20 should be withdrawn.

VII. Claim Rejections under 35 U.S.C. § 112

Claims 18-20 are rejected under 35 U.S.C. § 112, second paragraph. Applicant respectfully requests the Examiner to withdraw this rejection of the claims in view of the self-explanatory amendments being made herein and in view of the following comments.

Claim 18 is rejected as allegedly being unclear whether the first peripheral device or the most downstream peripheral device outputs the synchronization signal and calculates the time (*see* page 13 of the Office Action). Applicant respectfully traverses this rejection in view of the following comments. Each peripheral device outputs the synchronization signal and calculates the time as if it was the most downstream node. In view of the foregoing, Applicant respectfully requests the Examiner to withdraw this rejection of claim 18.

The withdrawal of the rejection of claims 19 and 20 is respectfully requested in view of the self-explanatory claim amendments being made herein.

VIII. Claim Rejections under 35 U.S.C. § 102

Claim 13 is rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,822,615 to Yamashita et al.[1] (hereinafter "Yamashita"). Applicant respectfully traverses this rejection in view of the following comments.

Independent claim 13, among a number of unique features, recites: "a communication cable including a data transmission cable for data transmission and a data transmission cable for data reception… wherein a communication cycle in the communications between the numerical control apparatus and the peripheral devices is split into a plurality of sub cycles to process data to be processed in the communication cycle in the split plurality of sub cycles."

In conventional techniques, a peripheral device transmits data to the NC apparatus once in a main cycle so that notice is made only once per servo synchronization cycle. In an exemplary embodiment of the present invention, however, data is split into a number of pieces and each data piece is transmitted once in a sub cycle. Accordingly, emergency stop information may be transmitted in each piece of data. This assures real-time conveyance of emergency stop information.

Yamashita, on the other hand, relates to controlling a distributed type remote input output system by having a bidirectional serial transmission between the basic system and each of the remote units. In case where the distributed type remote unit can not detect a receiving start state of a transmission frame from the basic system of the NC unit for a specified period of time, output is reset, and the basic system of the NC unit checks a type of and data setting in the

[1] Cited by Applicant in the Information Disclosure Statement filed on January 22, 2002.

remote unit, and also checks a result for an input/output test and the current situation of communication according to a header pattern of a transmission frame (col. 5, lines 1 to 25).

In Yamashita, however, the alleged cycle includes a plurality of time slots for time division multiplexing. That is, Yamashita simply discloses having a cycle include a number of bidirectional time slots (Fig. 9). In Yamashita, each time slot is not split into a number of sub-slots so that data is transmitted in a number of sub slots as opposed to one slot. In other words, Yamashita discloses having a number of bidirectional timeslots and not a cycle split into a number of sub-cycles.

Furthermore, Yamashita discloses that in conventional techniques, one cable for transmission and one cable for reception are provided (Fig. 31; col. 1, lines 42 to 52). Yamashita further discloses that these systems are inefficient as they require a large packing space and has low reliability as one of the lines may break down (col. 3, lines 48 to 65). Accordingly, Yamashita discloses having one or more bidirectional lines, which can send data in both directions via time multiplexing (Fig. 9).

In other words, Yamashita discloses a conventional technique of having unidirectional lines and then discloses its technique of having bidirectional lines transmitting data in both directions via time multiplexing (alleged cycle). In short, Yamashita does not disclose or suggest a system that would have dedicated and unidirectional lines and would also time multiplex the data. These are alternative techniques. They cannot be used together as this would defeat the purpose of the unidirectional lines.

For at least these exemplary reasons, claim 13 is patentably distinguishable from Yamashita. In view of the foregoing, Applicant respectfully requests the Examiner to withdraw this rejection of claim 13.

IX. New Claims

In order to provide more varied protection, Applicant adds claims 25-30, which are patentable at least by virtue of their dependency on claim 13.

X. Allowable Subject Matter

Claims 17-20 contain allowable subject matter. Applicant respectfully requests the Examiner to allow claim 17. With respect to claims 18-20, the rewriting of these claims is held in abeyance until arguments presented above with respect to claim 13 have been reconsidered.

XI. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: August 25, 2006

Attorney Docket No.: Q68150